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DOC ID #	150772
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PRP	RMD - SAUGET AREA II
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SAUGET AREA 2
ILD000605790

Reference No. 14

150772

TRIP REPORT

for:

SAUGET AREA 2
SAUGET, ILLINOIS

ILD 000605790

PREPARED BY:
ILLINOIS ENVIRONMENTAL PROTECTION AGENCY
BUREAU OF LAND
FEDERAL SITE REMEDIATION SECTION
SITE ASSESSMENT UNIT

MARCH 2000

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TRIP REPORT FOR SAUGET AREA 2

On May 24 - 27, 1999 the Illinois Environmental Protection Agency (Illinois EPA) conducted an Expanded Site Inspection of the Sauget Area 2 sites located in the Village of Sauget, Illinois in St. Clair County (Figure 1). The sites are designated: Site O, Site P, Site Q, Site R, and Site S. Sampling activities were conducted at these locations (Figure 2) to investigate potential groundwater and soil contamination from waste disposal activities related to the manufacture of chemicals by Monsanto/Solutia-W. G. Krummrich Plant. Representing the Illinois EPA were Brad Taylor, Bruce Everetts, Mark Weber, Ted Prescott, Ann Cross, and Ken Corkill from the Site Assessment Unit and Tom Miller and Gina Search from the Illinois EPA's Collinsville Field Operations Section (FOS).

The W. G. Krummrich Plant is the chemical manufacturing facility of Solutia Incorporated located in Sauget, Illinois. The Area 2 sites collectively cover an area of approximately 312 acres. The individual site acreage is as follows: Site O (22.48 acres), Site P (28.6 acres), Site Q (225.1 acres), Site R (24.75), and Site S (10.76 acres). Please refer to Attachment 1 for area measurements. Sites Q and R are located adjacent to the Mississippi River and west of the Corp. of Engineers 500-year flood control levee. Sites O, P, and S are located east of the flood control levee. For specific site borders and locations relative to the other Area 2 sites and the main manufacturing plant (W.G.Krummrich Plant) please refer to Figure 2.

The W. G. Krummrich facility was acquired by Monsanto Chemical Co. as an operating facility in 1917. This facility was formerly known as the Commercial Acid Company which manufactured sulfuric acid, zinc chloride, chlorosulfonic acid and sodium sulfate. Over the course of operations at the facility, Monsanto has manufactured a wide variety of chemicals, both organic and inorganic. According to a 1992 Resource Conservation and Recovery Act (RCRA) Facility Assessment Report, the following products and wastes have been or are presently generated: spent halogenated and non-halogenated solvents, mercury contaminated wastes, chlorobenzenes, nitrochlorobenzene and benzene compounds, phenols, phosphorus, polychlorinated biphenyl (PCB) compounds, dioxin, aromatic nitro compounds, amines and nitroamines, agent orange, maleic anhydride, acids and caustics. Industrial wastes generated at the W. G. Krummrich facility throughout its operational history have been disposed within its property boundaries (Lots B, C and F) and in various landfill areas within the Village of Sauget. Such disposal areas have been identified through investigation and environmental sample collection over a period of approximately thirty years. Five of these locations have been grouped into what is referred to as Sauget Area 2 (Sites O, P, Q, R, and S). Analysis of environmental samples collected from each Area 2 site reveal chemicals similar to those previously or currently produced by the W. G. Krummrich Plant. Refer to Figure 3 for sample locations.

Site O consists of four, unlined, former settling lagoons used by the old Village of Sauget Wastewater Treatment Plant to dewater sludge generated from treatment of wastewater originating from the Village of Sauget. Ninety-five percent of the wastewater was generated by

local industries. Monsanto contributed approximately eighty percent of the industrial volume. Site O is located west of the W.G. Krummrich Plant and east of Sites Q and R. Site O is approximately 22.5 acres in size and was in operation from 1966 to 1978. The sludge beds (settling lagoons), as constructed, were excavated into the Henry Formation sand. They were closed and covered in 1978. A 1988 Ecology and Environment (E & E) report states that soil borings indicated much of the sludge may have been removed prior to closure. However, some sludge or sludge neutralized with lime was found in a number of soil borings drilled within the lagoons. Staining of sand deposits was also observed beneath the sludge material. The lagoons were found to be covered with a silty clay cap ranging in thickness from one to seven feet. Vegetation in the form of grass, bushes and trees has subsequently been established on the cover material. Chemical analysis of soil and groundwater samples collected from Site O during previous sample events revealed contaminant concentrations exceeding regulatory soil benchmarks and groundwater quality standards. Analysis of samples collected during the May 1999 IEPA environmental investigation indicate volatile, and semi-volatile contaminants in soil and groundwater with a dioxin analyte also within the groundwater. Contaminants present (refer to Sample Summary Tables) correspond to products and wastes generated by Monsanto/Solutia-W.G. Krummrich Plant.

Site P is known as Sauget-Monsanto Landfill. The landfill is located northwest of the W.G. Krummrich Plant, north of the other Sauget Area 2 sites. Information from the 1988 E & E report indicate that based on soil borings fill material consisting of silty clay, cinders, slag and refuse was disposed directly onto the land surface. The soil borings also indicate Site P is unlined, as fine to medium grain sand was found immediately beneath the fill. Groundwater, during the 1988 investigation, was noted to be between 25 and 30 feet below ground surface. Site P is approximately 28.6 acres in size. One existing business, P.T.'s Show Club, is located in the southwest corner of Site P. A 500-year flood control levee protects Site P from direct Mississippi River flood events. In January 1973, IEPA issued an operating permit to Sauget and Company to accept only non-chemical waste from Monsanto Chemical Company, W. G. Krummrich Plant. Permit violations were documented throughout the operation of the landfill, which included discovery of chlorinated industrial wastes from Monsanto. IEPA required the removal of this material from the landfill. It is unclear, however, if Monsanto ever fulfilled this requirement. During a 1991 IEPA inspection of Site P, elevated levels of volatile organic compounds were documented in the landfill and around its perimeter. These constituents also correspond to products and wastes generated by Monsanto. The May 1999 IEPA inspection (refer to Sample Summary Tables) revealed volatile, semi-volatile, pesticide, PCB, inorganic and dioxin analytes contaminating soil. Analysis of groundwater revealed semi-volatile, pesticide, PCB, and inorganic analyte contamination. Groundwater was extracted and sampled from between 24 and 28 feet below ground surface.

Site Q is known as the Sauget and Company Landfill. The landfill is an inactive facility located south of Site R, with the west side of the landfill bordering the Mississippi River and the east side bordering the flood control levee. The landfill is, as Site R, located along the Mississippi River west of the Krummrich Plant and situated on the Mississippi River floodplain which floods

almost yearly. Due to the flood event in spring/summer 1993, a number of drums and wastes were unearthed from this landfill. The drums and wastes became the subject of a CERCLA time critical removal coordinated by USEPA Region 5. The landfill, which was operated by Sauget and Company under contract with Monsanto Chemical Company from approximately 1966 until 1973, is unlined and covers approximately 225 acres. No engineered cap has ever been placed over this landfill. Past investigations indicate that the majority of the site is covered with approximately four feet of cinders and fly ash used as cover material for refuse and other types of fill. Refuse and buried fill were reported to range in thickness from 3 to 28 feet (E & E 1983). Industrial, solid and liquid wastes generated by Monsanto were deposited in and documented to exist in this landfill. Environmental samples collected from Site Q document the presence of contaminants in unearthed drums, groundwater, soil and sediment corresponding to the products and wastes generated by the W. G. Krummrich facility. These contaminants are above regulatory benchmarks. The May 1999 investigation revealed VOC, semi-volatile, pesticide, PCB, inorganic and dioxin contaminants throughout Site Q (refer to Sample Summary Tables).

Site R is known by at least four different names: Sauget Toxic Dump, Krummrich Landfill, Monsanto Landfill, or River's Edge Landfill. The landfill, located along the Mississippi River west of the W.G. Krummrich Plant and situated in the Mississippi River floodplain, is approximately 25 acres in size and unlined. Site R, being situated between the Mississippi River and the flood control levee, constructed in the early 1950's (east of the landfill), is subject to periodic flooding. The landfill was operated by Sauget and Company under contract with Monsanto Chemical Company from approximately 1957 until 1977. Monsanto reportedly disposed of liquid and chemical wastes from the W. G. Krummrich Plant and their J.F. Queeny Plant. Chlorinated compounds, including PCB's, and phenols were part of Monsanto's manufactured products. Wastes subsequently generated from these manufacturing processes are known to have been disposed in Site R. Previously conducted environmental investigations have documented contamination of soil and groundwater within and in the immediate vicinity of Site R. Sediment samples collected along the bank of the Mississippi River, along the west edge of Site R, reveal contaminated sediments which exceed environmental benchmarks. During the May 1999 IEPA environmental investigation no samples were obtained from within the fenced boundaries of Site R. However, soil and groundwater samples were obtained from various locations surrounding Site R (refer to Sample Summary Tables). These samples revealed VOC, semi-volatile, pesticide, PCB, and inorganic contaminants in both media, on both, the east and west sides of Site R. Dioxin analytes were also detected in both groundwater and soil samples collected immediately east of Site R in the dog leg of Site Q

Site S is located approximately 100 feet west-southwest of Site O. This area is approximately 11 acres in size and is currently covered mainly with gravel with a small portion covered by an asphalt parking lot and driveway. Aerial photographs from May 1973 and March 1975 revealed this area was used for drum disposal. Drums can be seen in and around standing water within an excavated pit, in both the 1973 and 1975 photos. Historical information pertaining to what this property was used for has not been found. The contents of the drums disposed in Site S are unknown. Analysis of soil samples collected from Site S during previous environmental

investigations revealed high concentrations of volatile organic compounds, PCB's and heavy metals which correspond to constituents produced or wastes generated by Monsanto. During the May 1999 IEPA environmental investigation samples were obtained from two locations within the fenced boundaries of Site S (refer to Sample Summary Tables). These samples revealed VOC, semi-volatile, pesticide, and inorganic contaminants in groundwater and a few VOC, semi-volatile, pesticide, and dioxin contaminants in low concentrations within the soil.

Sample collection at each Area 2 site was completed through use of the Agencys GeoProbe, direct push equipment. Thirteen soil samples were collected from twelve borings, along with sixteen groundwater samples from sixteen boring locations. Proposed sample G105 was not collected due to the viscosity of the liquid found at depth. Eleven of the sample locations were common to both soil and groundwater. See Figure 3 for sample locations.

All soil and groundwater sampling was conducted in accordance with the IEPA's Quality Assurance Project Plan Standard Operating Procedures for sampling with a GeoProbe. Sampling at the Area 2 sites required the GeoProbe operator to pre-probe a sample location with a pre-probe device to penetrate either a gravel pack (generally averaging two feet thick) or hard surface. Once through the gravel pack or other surface the pre-probe was retracted from the bore hole and removed from the probe rod string. A four foot long Macro-Core sample tube with polyethylene sleeve was attached to the rod string and advanced into the soil to a depth of four feet below surface grade to obtain a soil core. The Macro-Core tube was retracted from the bore hole, the poly sleeve was removed from the Macro-Core tube and then placed on a sheet of plastic. This process was repeated to obtain cores to various depths. The sleeves were sliced open one at a time and monitored with a Toxic Vapor Analyzer (TVA), lithology was noted and any soil staining or anomalies were noted prior to moving to the next core. For this sampling event a soil sample from each boring was collected (except at locations where groundwater only was to be collected) from one area within the length of the boring exhibiting the highest TVA reading or was visibly contaminated. Depths at which samples were collected and general descriptions of each location are presented in Attachment 2. Analysis of the organic, VOC, semi-volatile, pesticide, PCB fractions were analyzed by the Illinois Environmental Protection Agency's organics laboratory located in Springfield Illinois. Analysis of the inorganic fraction was conducted by the IEPA's Inorganics laboratory located in Champaign, Illinois. Dioxin analysis was completed by Prairie Analytical Systems located in Springfield, Illinois. A summary of these analysis can be found in table form at the end of this report.

Groundwater samples, collected from common soil sample bore holes, were collected by inserting either a screen point sampler or millslot screen sampler into the same hole used to obtain the soil sample. Groundwater samples from locations exclusive for groundwater were collected utilizing the above mentioned procedures but no soil sample was collected. Collecting soil cores allowed lithology of the location to be noted. The groundwater sample screens were then, in most instances, driven to twenty feet below surface which was approximately five feet below the water table. If using a screen point sampler, the drive rods were retracted four feet to expose the screen, which allowed sampling of groundwater from sixteen to twenty feet. If using

the millslot sampler, two feet of exposed slot area allowed sampling from eighteen to twenty feet. To purge and then sample, polyethylene, size 6, 1/4" I.D., 3/8" O.D. tubing was inserted through the center of the rod string to depth. A peristaltic pump was used to withdraw water. Samples were collected after clarity improved and criteria for aquifer stabilization was met. Analysis of the groundwater samples was conducted by the same laboratories mentioned above. A summary of these analysis can be found in table form at the end of this report.

Analytical results of the May 24 - 27 sampling activity indicated levels of numerous volatile, and semi-volatile compounds in soil significantly above background (background used is sample X101 from the May 10-13, 1999 Expanded Site Inspection at the W. G. Krummrich Plant in Sauget, Illinois) within all samples except X102, X109, and X110. Pesticides and PCB's were found in concentrations significantly above background in all samples. At least one dioxin analyte was found in samples X103 - X105, X107, X109 - X111, and X113. These samples were collected from locations throughout Area 2. Specific compounds found in concentrations significantly exceeding background levels are: benzene, toluene, chlorobenzene, ethylbenzene, xylene, phenol, 2-chlorophenol, 1,4-dichlorobenzene, 1,2-dichlorobenzene, 4-methylphenol, 1,2,4-trichlorobenzene, 4-chloroaniline, 2,4,6-trichlorophenol, 2-nitroaniline, a number of PAH's, pesticide, aroclor and dioxin analytes.

Inorganic analysis of the soil samples indicated several analytes significantly exceeded background levels. Specific analytes were antimony, arsenic, barium, cadmium, chromium, copper, lead, mercury, vanadium and zinc. Samples X102 - X105, and X107, X109, X111 - X113 were found to contain one or more of the mentioned analytes significantly exceeding background.

Analytical results of groundwater collected during the May 24 - 27 sampling event indicated levels of benzene, toluene, chlorobenzene, phenol, 2-chlorophenol, 1,4-dichlorobenzene, 1,2-dichlorobenzene, 4-methylphenol, nitrobenzene, 2,4-dichlorophenol, 4-chloroaniline, 2,4,6-trichlorophenol, 4-nitrophenol, 4-nitroaniline, and pentachlorophenol were significantly above background (background used is sample G101 from the May 10-13, 1999 Expanded Site Inspection at the W. G. Krummrich Plant in Sauget, Illinois) within a number of samples. Samples G101, G102, G104, G112, G113, and G116 were found to contain one or more of these compounds. Pesticides and PCB's were found in concentrations significantly above background in all samples except G101, G102, G105, G114, and G115. Dioxin analytes were found in G104 and G112.

Inorganic analysis of the groundwater samples indicated several analytes exceeded background levels. Specific analytes were arsenic, manganese, potassium, selenium, sodium, and cyanide. Samples G101, G102, G104, G110, G112, G116 were found to contain one or more of the mentioned analytes exceeding background.

Results of the May 24 - 27 sample analysis indicate that soil and groundwater at the Area 2 sites are contaminated with chemical constituents similar to constituents of chemicals manufactured

at the W. G. Krummrich Plant.

The Area 2 sites are situated on relatively flat terrain of the Mississippi River flood plain referred to as the American Bottoms. Geology of the area consists of the American Bottoms, containing unconsolidated valley fill deposits composed of Cahokia Alluvium, overlying glacial till material of the Henry Formation. The glacial till is underlain by Mississippian age limestone and dolomite bedrock with minor layers of sandstone and shale interbedded.

The Cahokia Alluvium includes the deposits in the floodplain and channels of rivers and streams throughout the state. Locally the alluvium is approximately 40 feet thick and consists of poorly sorted silt, clay, and silty sand with some interbedded sand and gravel lenses. This material becomes courser with depth. The alluvium deposits unconformably overlie the Henry Formation which is approximately 95 feet thick at the Mississippi River and thins with distance from the river. These valley-train materials are generally medium - course sand and gravel which also increase in grain size with depth.

Previous drilling programs conducted across the Area 2 sites have determined that the Alluvium consists of fine gray and brown sand up to 40 feet below land surface. Unconsolidated deposits range from 140 feet thick near the river to 110 feet thick at the eastern edge of the Monsanto/Solutia property. The direction of groundwater flow in the American Bottoms area varies, reflecting changes of river stages. During normal stages groundwater flows toward the river. During high water or flood stages groundwater flows away from the river.

Area residents and businesses obtain their drinking water from the Illinois American Water System which utilizes an intake in the Mississippi River approximately five miles upstream of Sauget. There are, however, a few individuals in the area near Sauget still using ground water wells. In what capacity is not known.

Figures, Tables & Attachments

FIGURES

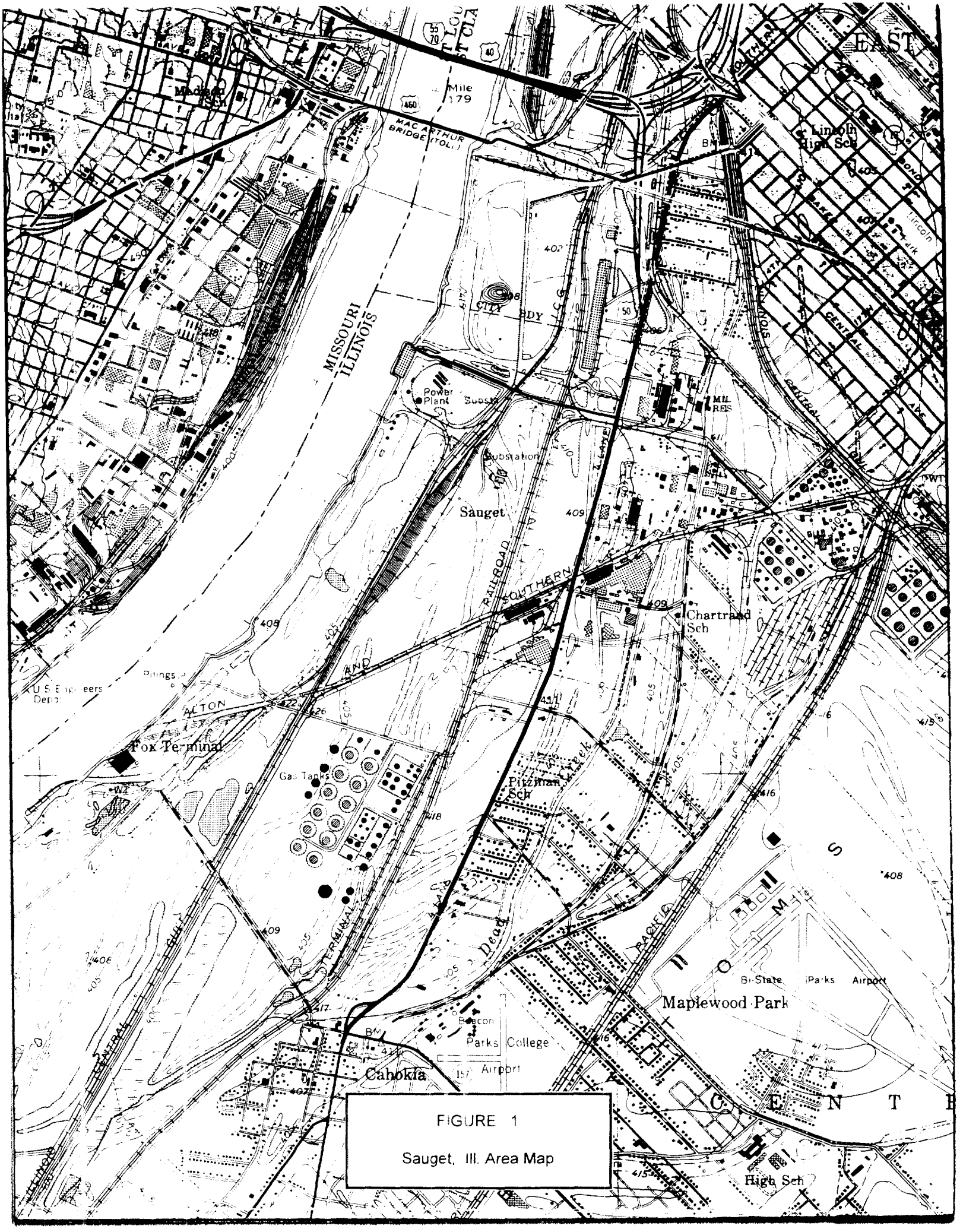

FIGURE 1

Sauget, Ill. Area Map

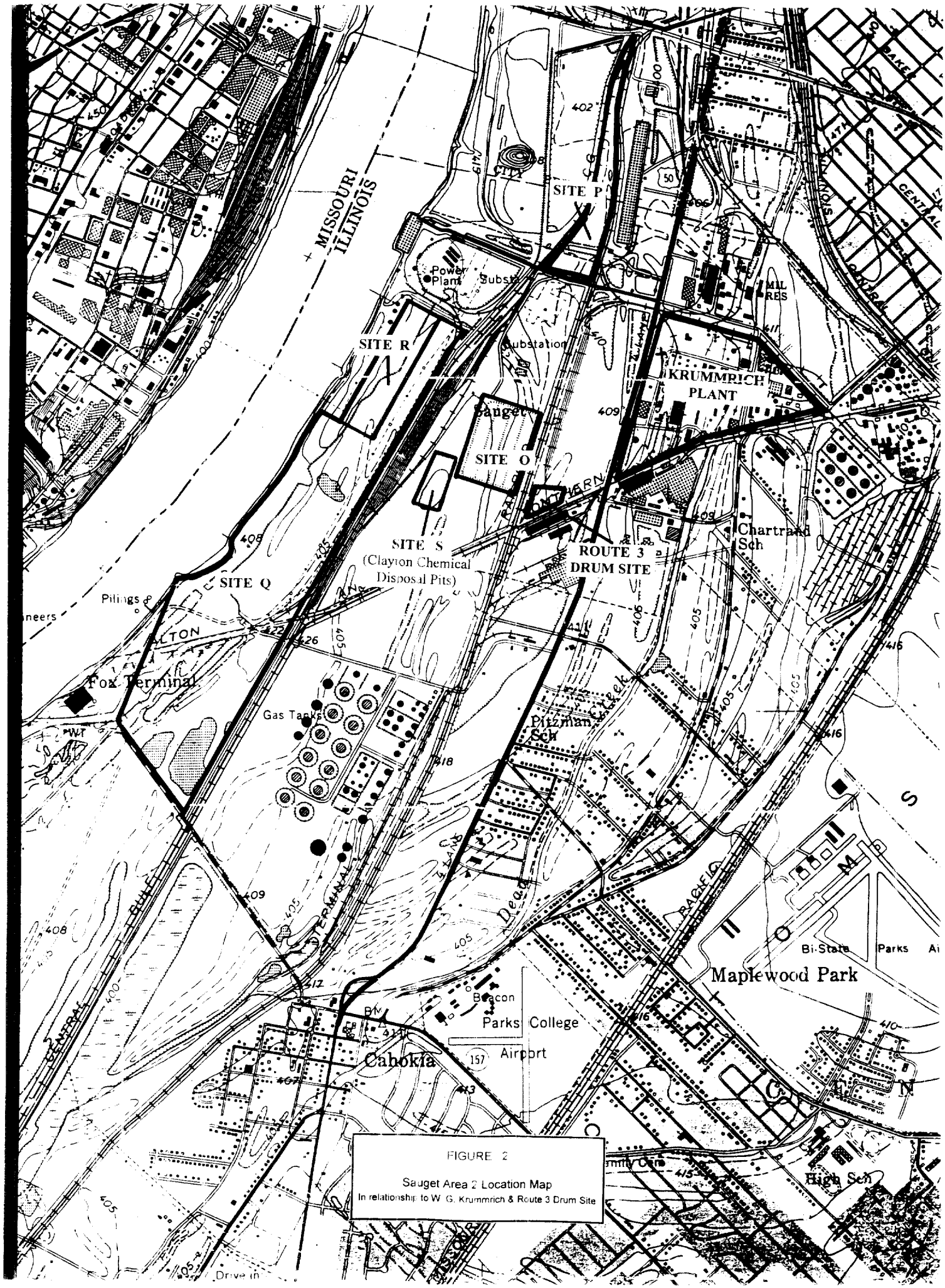

FIGURE 2

Sauget Area 2 Location Map

In relationship to W. G. Krummrich & Route 3 Drum Site

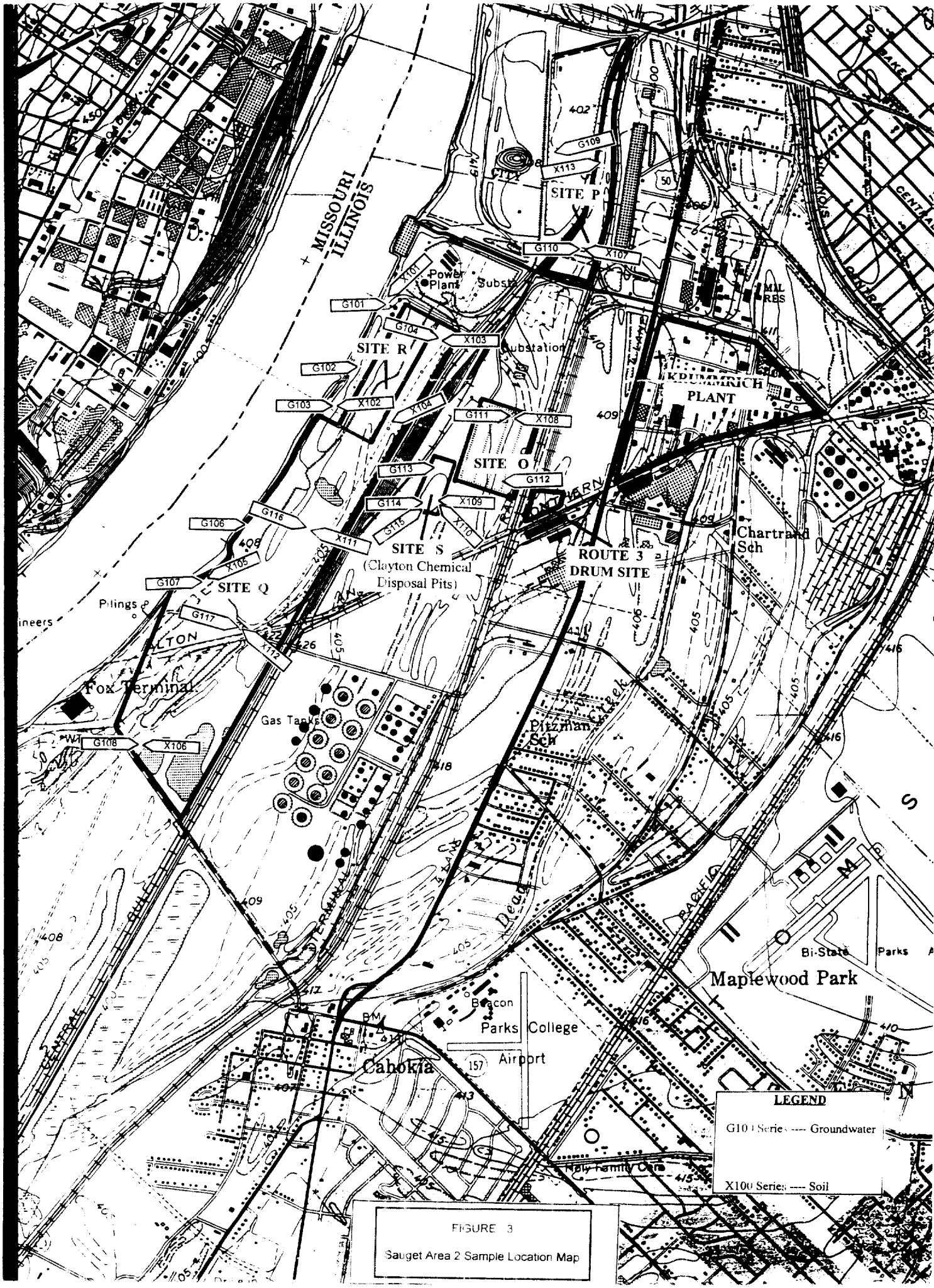

FIGURE 3

Sauget Area 2 Sample Location Map

SOIL SAMPLE SUMMARY

SAUGET AREA 2
SOIL SAMPLE SUMMARY

SAMPLING POINT	X101	X102	X103	X104	X105	X106	X107	X108	X109	X110 (Dup of X109)	X111	X112	X113
	5-24-99	5-24-99	5-26-99	5-26-99	5-27-99	5-25-99	5-26-99	5-24-99	5-25-99	5-25-99	5-26-99	5-27-99	5-25-99
	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
pH (in Lab)	8.5	7.9	9.1	10.8	7.2	7.9	9.9	8.0	8.3	8.3	7.1	7.6	8.2
VOLATILES (Encore)													
Acetone	–	7 JB	–	1100 J	72 B	3 JB	430 J	3 JB	4 JB	4 JB	500 J	3 JB	570 J
Methylene Chloride	2500 DB	–	–	–	3 JB	–	–	–	–	–	–	2 JB	–
2-Butanone	–	–	–	310 J	18	–	–	–	–	–	250 J	–	–
Benzene	–	–	320 J	5800	–	–	10000	–	–	–	480 J	–	370 J
Trichloroethene	–	–	–	–	–	–	–	–	–	–	670 J	–	–
4-Methyl-2-Pentanone	–	–	160 J	950 J	–	–	390 J	–	–	–	280 J	–	–
Toluene	–	–	2500	4800	–	3 J	25000	–			1400 J		240 J
Tetrachloroethene	–	–	–	520 J	–	–	–	–	–	–	–	–	–
Chlorobenzene	260000	21 J	240 J	13000	260	–	800 J	2 J	4 J	3 J	900 J	–	400 J
Ethylbenzene	–	–	–	6200	–	–	3600	–	–	–	7400	–	1400
Xylene (total)	–	–	400 J	34000	–	–	15000	–	–	–	27000	–	6300
	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg
SEMIVOLATILES													
Phenol	–	–	–	220000	–	–	18000 J	–			140 J		65000 D
bis-(2-chloroethyl) Ether	–	82 J	–	–	–	–	–	–	–	–	–	–	–
2-Chlorophenol	870			22000 J				–	–	–		–	–
1,4-Dichlorobenzene	–	–	6800 J	48000 J	210 J	–	–	–	–	–	490 J	66 J	8600
1,2-Dichlorobenzene	–	–	–	24000 J	–	–	–	–	–	–	100 J	–	–
4-Methylphenol	–	–	–	–	–	–	–	–	–	–	300 J	–	5400
2,4-Dichlorophenol	–	–	–	57000 J	–	–	–	–	–	–	–	–	–
1,2,4-Trichlorobenzene	–		–	430000	–	–	–	–	–	–	–	–	–
Naphthalene	–	–	–	17000 J	–	–	–	–	–	–	860	–	–
4-Chloroaniline	–	–	–	20000 J	–	–	–	–	–	–	1100	–	23000
2-Methylnaphthalene	–	–		–	–	–	–	–	–	–	540	–	–
2,4,6-Trichlorophenol				28000 J	–	–	–	–	–	–	–	–	–
2-Nitroaniline	–	–	–	11000 J	–	–	–	–	–	–	–	–	–
Acenaphthene	–	–	–	–	–	–	–	–	–	–	140 J	–	–
Dibenzofuran	–	–	–	–	–	–	–	–	–	–	130 J	–	–
Diethylphthalate	–	–	–	–	–	–	–	–	–	–	1200	–	–
Fluorene	–	–	–	–	–	–	–	–	–	–	180 J	–	–
N-Nitrosodiphenylamine	–	–	–	–	–	–	–	–	–	–	510	–	–
Pentachlorophenol	–	–	–	–	–	–	–	720 J	–	–	2500	–	7600 J
Phenanthrene	–	–	–	–	–	56 J	–	–	–	–	1100	140 J	–
Anthracene	–	–	–	–	–	–	–	–	–	–	160 J	–	–
Di-n-butylphthalate	–	83 JB	–	–	–	–	–	–	58 JB	–	210 B	–	–
Fluoranthene	–	–	–	–	79 J	96 J	–	–	–	–	850	180 J	–
Pyrene	–	–	–	–	67 J	100 J	–	75 J	–	–	1600	140 J	–
Butylbenzylphthalate	–	–	–	–	–	–	–	–	–	–	340 J	–	49000 D
Benzo(a)anthracene	–	–	–	–	–	56 J	–	–	–	–	500	94 J	–
Chrysene	–	–	–	–	–	69 J	–	–	–	–	920	99 J	–
bis(2-Ethylhexyl)phthalate	–	–	–	15000 JB	67 J	–	–	–	–	–	12000 D	–	–
Benzo(b)fluoranthene	–	–	–	–	–	83 J	–	–	–	–	600	89 J	–
Benzo(k)fluoranthene	–	–	–	–	–	61 J	–	–	–	–	440 J	84 J	–
Benzo(a)pyrene	120 J					55 J					460 J	71 J	–
	ug/g	ug/g	ug/g	ug/g	ug/g	ug/g	ug/g	ug/Kg	ug/g	ug/g	ug/g	ug/g	ug/g

– Constituent analyzed for but not detected, constituent value below Contract Required Quantitation Limit (CRQL)
J Indicates an estimated value
D Analysis performed at a secondary dilution factor
P Indicates a pesticide/aroclor target analyte when there is greater than 25% difference for the detected concentrations between the two columns. The lower of the two results is reported.
B The reported value is less than the CRDL but greater than the instrument detection limit (IDL)

SAUGET AREA 2
SOIL SAMPLE SUMMARY

SAMPLING POINT	X101	X102	X103	X104	X105	X106	X107	X108	X109	X110 Dup of X109	X111	X112	X113
	5-24-99 Soil	5-24-99 Soil	5-26-99 Soil	5-26-99 Soil	5-27-99 Soil	5-25-99 Soil	5-26-99 Soil	5-24-99 Soil	5-25-99 Soil	5-25-99 Soil	5-26-99 Soil	5-27-99 Soil	5-25-99 Soil
pH (in Lab)	8.5	7.9	9.1	10.8	7.2	7.9	9.9	8.0	8.3	8.3	7.1	7.6	8.2
PESTICIDES													
alpha-BHC	–	0.20 JP	–	–	0.47 JP	–	–	–	–	–	–	–	–
delta-BHC	0.79 JP	–	68 P	–	2.4 JP	–	–	–	–	–	–	–	–
gamma-BHC (Lindane)	–	–	55 P	–	–	–	–	0.16 JP	–	–	–	–	–
Heptachlor	–	0.38 JP	2.3 P	–	–	–	–	–	–	–	25 P	–	–
Aldrin	–	–	–	–	–	–	–	–	–	–	–	–	140 P
Heptachlor epoxide	–	–	–	–	–	–	–	–	–	–	11 P	–	63 P
Endosulfan I	0.32 JP	–	24 P	–	3 P	–	440 P	0.07 JP	0.089 JP	0.11 JP	11 P	0.19 JP	1.2 JP
Dieldrin	–	0.39 JP	–	–	–	0.061 JP	–	–	0.15 JP	–	–	0.23 JP	–
4,4'-DDE	3.4 J	0.22 JP	320	730000 P	12 P	0.61 JP	210 P	0.2 JP	0.17 J	0.29 J	120	0.97 JP	77 P
Endrin	–	1 JP	–	–	1.2 JP	0.52 JP	– P	–	–	–	90 P	4.6 P	43 P
Endosulfan II	–	0.089 JP	–	–	12	0.33 JP	320	–	–	–	150	–	–
4,4'-DDD	–	0.85 JP	340 P	–	–	0.98 J	–	–	–	–	30 P	4	48 P
Endosulfan Sulfate	–	–	59 P	–	1.5 JP	–	–	–	–	–	–	–	18
4,4'-DDT	0.22 JP	0.86 J	48 P	53000 JP	5.2 P	0.71 JP	2.7 JP	–	0.095 JP	–	–	4 P	–
Endrine ketone	–	–	–	–	–	–	–	–	–	–	–	–	–
Endrine aldehyde	2 JP	0.15 JP	87 P	–	20	0.91 JP	–	–	0.1 JP	0.098 JP	62 P	1.4 JP	–
alpha-chlordane	–	–	–	–	5 P	–	–	–	–	–	–	–	–
gamma-Chlordane	–	0.16 JP	23 P	–	P	0.021 JP	–	–	–	–	–	–	9.6 P
Aroclor-1016	18 J	–	5200	5400000	82 P	–	–	–	–	–	1800	–	–
Aroclor-1232	22 J	–	10000	8800000	180	–	–	–	–	–	2600 P	–	–
Aroclor-1242	28 JP	–	8000	8500000 P	180	–	–	–	–	–	3000	–	2400
Aroclor-1248	110 P	–	8900	25000000	210	–	4400	–	–	–	2700	–	2000
Aroclor-1254	85	4.8 J	7100	17000000	490	11 J	5900 P	7.6 J	3.9 JP	6.3 JP	2400	16 J	2000
Aroclor-1260	33 JP	5.4 J	–	8100000 P	250 P	12 J	–	5.8 JP	–	2.5 JP	1800 P	–	–
	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg
INORGANICS													
Aluminum	7400	18100	2490	1920	13600	2830	9630	10900	2400	2450	10400	13500	6350
Antimony	–	–	1.6 B	1.5 B	–	–	–	–	–	–	–	–	18.4
Arsenic	5.7	49.4	6.8	2 B	8.9	3.2	9.7	7.8	2.3	2.3	9.9	7	4.2
Barium	188	99	1910	2450	243	72.1	136	234	71.5	69.3	183	116	119
Beryllium	0.5 B	4	0.29 B	–	0.74 B	0.21 B	0.72 B	0.65 B	–	–	0.63 B	0.71 B	0.81 B
Cadmium	–	2.3	12	0.83 B	0.43 B	0.36 B	4.9	–	–	–	0.52 B	0.39 B	0.94 B
Calcium	13700	20200	114000	13500	15800	5610	52900	16600	4880	6260	28300	12400	87500
Chromium	10.9	57.3	14.5	8.6	22.8	5	20.1	15.7	5	4.9	32.4	22.2	21.9
Cobalt	6.1 B	14.4	2 B	3.3 B	8.6 B	3.5 B	7.4 B	7.9 B	3 B	3.3 B	7.7 B	8.9 B	3.7 B
Copper	11.2	35.8	179	12.2	33.7	4.7 B	49.2	14.5	1.4 B	2.3 B	34.9	24.4	28.6
Iron	12300	49400	5310	5320	27100	6430	17100	16000	5000	5200	55600	20100	13300
Lead	9.1	59.2	35.9	728	26.2	8.4	140	9.9	3.3	3.6	83.4	47.2	23.5
Magnesium	4860	2340	12000	1820	5750	1900	5950	7110	1780	2100	4520	6050	3960
Manganese	201	241	63	84	585	135	280	596	83	87.8	934	479	178
Mercury	–	0.025	1	0.58	–	–	1.4	–	0.025	–	0.6	–	291
Nickel	15.5	47.1	14.5	10.5	24.2	8.4	21.3	19.8	7.4 B	8 B	21.6	21.7	26.5
Potassium	1620	2130	371 B	342 B	2130	530 B	1410	2000	494 B	513 B	1790	1160 B	1610
Selenium	–	3	–	–	–	–	–	–	–	–	–	–	–
Silver	–	–	–	–	–	–	–	–	–	–	–	–	–
Sodium	240 B	473 B	693 B	172 B	162 B	128 B	346 B	195 B	166 B	151 B	341 B	142 B	1020 B
Thallium	–	–	–	–	–	–	–	–	–	–	–	–	–
Vanadium	20.9	96.7	16.1	7.6 B	33.8	8.9 B	33.4	30.1	7.5 B	8.1 B	35.5	34.1	26.3
Zinc	43.7	386	361	151	381	97.4	710	61.3	16.7	17.7	254	158	988
Cyanide	0.64 B	–	–	0.61	–	–	–	–	–	–	–	–	–
	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg

– Constituent analyzed for but not detected, constituent value below Contract Required Quantitation Limit (CRQL).
J Indicates an estimated value
D Analysis performed at a secondary dilution factor
P indicates a pesticide/arocior target analyte when there is greater than 25% difference for the detected concentrations between the two columns. The lower of the two results is reported
B The reported value is less than the CRDL but greater than the instrument detection limit (IDL)

T-10

SOIL SAMPLE BACKGROUND FOR SAUGET AREA 2

SOIL SAMPLE FROM
W. G. KRUMMRICH / SOLUTIA SAMPLE EVENT
5-10-99

SAMPLING POINT	X101 ECRP0 Background 5-10-99 Soil
pH (In Lab)	7.2
VOLATILES	S01
Vinyl Chloride	–
Acetone	–
Methylene Chloride	4 J
Carbon Disulfide	–
1,1-Dichloroethane	–
2-Butanone	–
cis-1,2-Dichloroethene	–
Chloroform	–
Benzene	–
Trichloroethene	–
4-Methyl-2-Pentanone	–
Toluene	5 J
Tetrachloroethene	–
Chlorobenzene	–
Ethylbenzene	–
Styrene	–
Xylene (total)	4 J
Isopropylbenzene	–
Bromobenzene	–
n-Propylbenzene	–
2-Chlorotoluene	–
4-Chlorotoluene	–
tert-Butylbenzene	–
1,2,4-Trimethylbenzene	–
sec-Butylbenzene	–
1,3-Dichlorobenzene	–
p-Isopropyltoluene	–
1,4-Dichlorobenzene	–
1,2-Dichlorobenzene	–
n-Butylbenzene	–
1,2,4-Trichlorobenzene	–
Naphthalene	–
Hexachlorobutadiene	–
1,2,3-Trichlorobenzene	–
	ug/Kg
SEMIVOLATILES	
Phenol	–
2-Chlorophenol	–
1,3-Dichlorobenzene	–
1,4-Dichlorobenzene	–
1,2-Dichlorobenzene	–
4-Methylphenol	–
Nitrobenzene	–
2-Nitrophenol	–
2,4-Dichlorophenol	–
1,2,4-Trichlorobenzene	–
Naphthalene	–
4-Chloroaniline	–
Hexachlorobutadiene	–
2-Methylnaphthalene	–
2,4,6-Trichlorophenol	–
2,4,5-Trichlorophenol	–
2-Nitroaniline	–
3-Nitroaniline	–
Acenaphthene	–
4-Nitrophenol	–
Dibenzofuran	–
Diethylphthalate	–
Fluorene	–
4-Nitroaniline	–
N-Nitrosodiphenylamine	–
Hexachlorobenzene	–
Pentachlorophenol	–
Phenanthrene	–
Anthracene	–
Di-n-butylphthalate	–
Fluoranthene	–
Pyrene	–
Butylbenzylphthalate	–
Benzo(a)anthracene	–
Chrysene	–
bis(2-Ethylhexyl)phthalate	23 BJ
Benzo(b)fluoranthene	–
Benzo(k)fluoranthene	–
Benzo(a)pyrene	–
Indeno(1,2,3-cd)pyrene	–
Dibenz(a,h)anthracene	–
Benzo(g,h,i)perylene	–
	ug/Kg

– Constituent analyzed for but not detected, constituent value below Contract Required Quantitation Limit (CRQL)
J Indicates an estimated value
B The reported value is less than the CRQL but greater than the instrument detection limit (IDL)

SOIL SAMPLE BACKGROUND FOR SAUGET AREA 2

SOIL SAMPLE FROM
W. G. KRUMMRICH / SOLUTIA SAMPLE EVENT
5-10-99

SAMPLING POINT	X101 ECRPC Background 5-10-99 Soil
pH (in Lab)	7.2
PESTICIDES	
alpha-BHC	--
beta-BHC	--
delta-BHC	--
gamma-BHC (Lindane)	--
Heptachlor	1.4 PJ
Aldrin	--
Heptachlor epoxide	--
Endosulfan I	--
Dieldrin	--
4,4'-DDE	--
Endrin	--
Endosulfan II	--
4,4'-DDD	--
Endosulfan Sulfate	--
4,4'-DDT	--
Methoxychlor	--
Endrine ketone	--
Endrine aldehyde	--
alpha-chlordane	--
gamma-Chlordane	0.38 PJ
Aroclor-1248	--
Aroclor-1254	--
Aroclor-1260	--
	ug/Kg
INORGANICS	MEBWN5
Aluminum	6590
Antimony	--
Arsenic	7.3
Barium	230
Beryllium	0.52 B
Cadmium	0.14 B
Calcium	18200
Chromium	11
Cobalt	6.8 B
Copper	14.6
Iron	12700
Lead	9.5
Magnesium	6770
Manganese	331
Mercury	0.14
Nickel	17.8
Potassium	1320
Selenium	--
Silver	0.83 B
Sodium	224 B
Thallium	--
Vanadium	19.5
Zinc	41.5
Cyanide	--
	mg/Kg

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P Indicates a pesticide/aroclor target analyte when there is greater than 25% difference for the detected concentrations between the two columns The lower of the two results is reported
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GROUNDWATER SAMPLE SUMMARY

SAUGET AREA 2
GROUNDWATER SAMPLES

SAMPLING POINT	G101	G102	G103	G104	G105	G106	G107	G108
	5-24-99	5-24-99	5-24-99	5-26-99	5-27-99	5-27-99	5-27-99	5-25-99
	Water	Water	Water	Water	Water	Water	Water	Water
pH (In Lab)	8.1	7.7	10.3	6.5		7.5	6.6	7.0
VOLATILES								
					No water			
Vinyl Chloride	–	–	–	–	Available --	–	–	–
Acetone	56	3 J	–	320	**Oily Material.**	2 J	5 J	4 J
Methylene Chloride	–	–	–	30 J	Refer to	–	–	–
Carbon Disulfide	–	–	–	–	**Sample X104**	–	–	–
1,1-Dichloroethane	–	–	–	–	for Analysis.	–	–	–
1,2-Dichloroethene	–	–	–	–	–	–	–	2 J
2-Butanone	12	–	–	–	–	–	–	–
1,1,1-Trichloroethane	–	–	–	–	–	–	–	–
Chloroform	–	–	–	150 J	–	–	–	–
Benzene	30	44	–	13000 D	–	–	–	–
Trichloroethene	–	–	–	31 J	–	–	–	–
4-Methyl-2-Pentanone	18	–	–	420	–	–	–	–
Toluene	5 J	–	–	1000	–	–	–	–
Tetrachloroethene	2 J	–	–	–	–	–	–	–
Chlorobenzene	130000 D	260 D	–	14000 D	–	–	–	–
Ethylbenzene	–	–	–	–	–	–	–	–
Xylene (total)	–	–	–	–	–	–	–	–
	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
SEMIVOLATILES								
Phenol	–	–	–	21000 D	–	–	–	–
2-Chlorophenol	920 D	4 J	–	28000 D	–	–	–	–
1,3-Dichlorobenzene	–	–	–	–	–	–	–	–
1,4-Dichlorobenzene	–	23	–	1200	–	–	–	–
1,2-Dichlorobenzene	–	10	–	680 J	–	–	–	–
4-Methylphenol	3 J	–	–	450 J	–	–	–	–
Nitrobenzene	–	–	–	28000 D	–	–	–	–
2,4-Dimethylphenol	–	–	–	–	–	–	–	–
2,4-Dichlorophenol	–	–	–	130000 D	–	–	11	–
Naphthalene	–	–	–	–	–	–	–	–
4-Chloroaniline	–	1000 D	–	4500	–	–	–	–
2-Methylnaphthalene	–	–	–	–	–	–	–	–
2,4,6-Trichlorophenol	–	–	–	50000 D	–	–	6 J	–
2-Nitroaniline	–	–	–	160 J	–	–	–	–
4-Nitrophenol	–	–	–	3400	–	–	–	–
Dibenzofuran	–	–	–	–	–	–	–	–
Diethylphthalate	4 J	–	5 J	–	–	–	–	–
4-Nitroaniline	–	–	–	8500 DJ	–	–	–	–
N-Nitrosodiphenylamine	–	–	–	–	–	–	–	–
Pentachlorophenol	–	–	–	–	–	–	–	–
Di-n-butylphthalate	–	–	–	–	–	–	–	–
Butylbenzylphthalate	–	–	–	–	–	–	–	–
bis(2-Ethylhexyl)phthalate	–	–	–	–	–	–	–	–
	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
PESTICIDES								
alpha-BHC	0.0073 J	–	0.0046 JP	–	–	–	–	0.001 JP
beta-BHC	–	–	0.0011 JP	–	–	0.006 JP	–	–
delta-BHC	–	–	–	–	–	0.007 JP	0.01 JP	–
gamma-BHC (Lindane)	–	–	–	–	–	–	–	–
Aldrin	–	–	–	0.057 DJP	–	–	–	–
Heptachlor epoxide	–	–	0.011 JP	–	–	0.00026 JP	–	–
Endosulfan I	–	–	–	–	–	–	0.092 P	0.0018 JP
Dieldrin	–	–	–	–	–	0.0024 J	–	–
4,4-DDE	–	–	0.016 JP	–	–	0.0068 JP	0.52	0.015 JP
Endrin	–	–	–	–	–	0.012 JP	–	0.0068 JP
Endosulfan II	–	–	–	–	–	–	0.61	0.036 J
4,4-DDD	–	–	0.05 J	–	–	–	–	0.0053 JP
Endosulfan Sulfate	–	–	–	–	–	–		0.01 JP
4,4-DDT	–	–	–	–	–	0.013 JP	0.14 P	–
Endrine aldehyde	–	–	–	–	–	0.02 JP		0.052 JP
alpha-chlordane	–	–	–	–	–	0.018 JP	–	–
gamma-Chlordane	–	–	–	–	–	0.02 JP	–	0.003 JP
Aroclor-1216	–	–	0.18 JP	–	–	0.55 J	6.8	–
Aroclor-1232	–	–	0.18 JP	–	–	1.1 P	13	–
Aroclor-1242	–	–	–	–	–	0.88 J	12	–
Aroclor-1248	–	–	–	–	–	0.74 J	15	–
Aroclor-1254	–	–	–	–	–	0.5 J	19	0.55 J
Aroclor-1260	–	–	–	–	–	0.29 JP	17	0.75 J
	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
INORGANICS								
Aluminum	11200	44200	958	6910	–	2910	9750	7680
Arsenic	34.6	39.1	43.6	–	–	–	119	–
Barium	680	740	101 B	327	–	88.9 B	366	411
Beryllium	–	1.9 B	–	–	–	–	–	–
Cadmium	–	–	–	2.4 B	–	–	–	–
Calcium	780000	413000	544000	331000	–	108000	395000	114000
Chromium	16.6	93	7.5 B	22	–	6.6 B	28.8	14
Cobalt	5.5 B	18.3 B	–	43.1 B	–	–	5.8 B	11.6 B
Copper	–	45.6	2.3 B	22.3 B	–	6 B	6.8 B	12.5 B
Iron	10600	50200	1540	13800	–	3460	80700	10100
Lead	–	33.4	–	20.7	–	29.8	5.5	19
Magnesium	10500	40400	200 B	21400	–	17100	89000	25000
Manganese	1680	3610	15.2	11800 E	–	95.2	2930	2480
Mercury	–	–	–	–	–	–	–	–
Nickel	12.7 B	46.9	6.2 B	128	–	4.3 B	19.1	23.9 B
Potassium	17700	32000	59700	14200	–	17200	18400	11700
Selenium	26	–	10.7	–	–	–	–	–
Sodium	99500	39100	22300	325000	–	22600	93500	27300
Thallium	–	7 B	–	–	–	–	–	–
Vanadium	31.2 B	111	10.6 B	15.6 B	–	10 B	20.7 B	18.7 B
Zinc	42.2	156	51.2	241	–	162	201	89.2
Cyanide	10 B	10 B	–	12.2	–	–	–	–
	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L

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SAUGET AREA 2
GROUNDWATER SAMPLES

SAMPLING POINT	G109 Background	G110	G111	G112	G113	G114	G115 Dup of G114	G116	G117	FB Field Blank
	5-27-99 Water	5-26-99 Water	5-24-99 Water	5-25-99 Water	5-25-99 Water	5-25-99 Water	5-25-99 Water	5-26-99 Water	5-27-99 Water	5-26-99 Water
pH (in Lab)	6.6	6.9	7.3	6.9	6.8	7.1	7.3	6.6	6.7	
VOLATILES										
Vinyl Chloride	–	–	–	–	– J	–	–	–	–	Unknown
Acetone	2 J	20	3 J	18	5 J	2 J	2 J	8 J	–	Values
Methylene Chloride	–	–	–	–	–	–	–	–	–	
Carbon Disulfide	–	2 J	–	–	–	–	–	8 J	–	
1,1-Dichloroethane	–	–	–	–	4 J	–	–	–	–	
1,2-Dichloroethene	–	–	–	–	1 J	–	–	–	–	
2-Butanone	–	–	–	–	–	–	–	–	–	
1,1,1-Trichloroethane	–	–	11	–	–	2 J	3 J	–	–	
Chloroform	–	–	–	–	–	–	–	–	–	
Benzene	–	–	–	–	54	–	–	58	–	
Trichloroethene	–	–	–	–	–	–	–	–	–	
4-Methyl-2-Pentanone	–	2 J	–	–	1 J	–	–	–	–	
Toluene	–	2 J	–	–	18	–	–	–	–	
Tetrachloroethene	–	–	–	2 J	–	–	–	–	–	
Chlorobenzene	–	–	32	18	8 J	–	–	73	–	
Ethylbenzene	–	–	–	–	140	–	–	1 J	–	
Xylene (total)	–	–	–	J	2000 D	–	–	5 J	–	
	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
SEMIVOLATILES										
Phenol	–	12	–	–	4 J	–	–	–	–	Unknown
2-Chlorophenol	–	–	–	–	–	–	–	–	–	Values
1,3-Dichlorobenzene	–	–	–	3 J	–	–	–	–	–	
1,4-Dichlorobenzene	–	–	–	12	–	–	–	6 J	–	
1,2-Dichlorobenzene	–	–	–	16	11	–	–	–	–	
4-Methylphenol	–	5 J	–	–	–	–	–	–	–	
Nitrobenzene	–	–	–	11	–	–	–	–	–	
2,4-Dimethylphenol	–	–	–	–	38	–	–	–	–	
2,4-Dichlorophenol	–	–	–	–	–	–	–	7.6 J	2 J	
Naphthalene	–	–	–	–	550 D	–	–	–	–	
4-Chloroaniline	–	–	–	–	–	–	–	1000 D	–	
2-Methylnaphthalene	–	–	–	–	76	–	–	–	–	
2,4,6-Trichlorophenol	–	–	–	–	–	–	–	5 J	2 J	
2-Nitroaniline	–	–	–	17 J	–	–	–	–	–	
4-Nitrophenol	–	–	–	–	–	–	–	–	–	
Dibenzofuran	–	–	–	J	–	–	–	–	–	
Diethylphthalate	–	–	–	–	12	–	–	–	–	
4-Nitroaniline	–	–	–	–	–	–	–	–	–	
N-Nitrosodiphenylamine	–	–	–	–	2 J	–	–	–	–	
Pentachlorophenol	–	–	15 J	280 D	–	–	–	–	–	
Di-n-butylphthalate	–	–	–	–	49	–	–	–	–	
Butylbenzylphthalate	–	–	–	–	30	–	–	–	–	
bis(2-Ethylhexyl)phthalate	–	–	–	–	20	–	–	–	–	
	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
PESTICIDES										
alpha-BHC	–	–	–	–	0.026 JP	–	–	–	–	Unknown
beta-BHC	–	–	–	–	–	–	–	–	–	Values
delta-BHC	–	0.0056 JP	0.03 J	0	0.0064 JP	–	–	–	0.054 P	
gamma-BHC (Lindane)	–	0.065 P	–	–	–	–	–	–	–	
Aldrin	–	0.0064 JP	–	–	0.024 JP	–	–	0.12 P	0.072 P	
Heptachlor epoxide	0.0038 JP	–	–	–	–	–	–	0.041 JP	–	
Endosulfan I	–	–	–	–	–	–	–	–	0.011 JP	
Dieldrin	–	–	0.0078 JP	0.0045 JP	0.0066 J	–	–	–	–	
4,4'-DDE	0.0044 JP	–	–	–	–	–	–	–	0.086 JP	
Endrin	–	0.0046 JP	–	0.011 JP	0.011 JP	–	–	0.0068 JP	0.0051 JP	
Endosulfan II	–	0.008 J	0.005 JP	–	–	–	–	–	0.088 J	
4,4'-DDD	–	–	–	–	–	–	–	0.028 JP	–	
Endosulfan Sulfate	–	0.0028 JP	–	0.0084 JP	–	–	–	–	–	
4,4'-DDT	–	0.0048 JP	–	0.014 JP	–	–	–	0.045 JP	0.052 JP	
Endrine aldehyde	–	–	–	–	0.0033 JP	–	–	0.035 JP	–	
alpha-chlordane	–	0.0097 J	0.0012 JP		0.029 JP	–	–		–	
gamma-Chlordane	–	0.075 J	0.0016 J	0.023 J	–	–	–		–	
Aroclor 1016	0.25 J	–	–	–	–	–	–		2	
Aroclor 1232	0.52 J	–	–	–	–	–	–		3.9	
Aroclor 1242	0.32 J	–	–	–	–	–	–		3.1 P	
Aroclor 1248	0.2 J	–	–	–	–	–	–		3.2	
Aroclor 1254	–	–	–	–	–	–	–		3.6	
Aroclor 1260	–	0.087 JP	–	–	–	–	–		2.9	
	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
INORGANICS										
Aluminum	9680	2720	38300	8750	241	1810	1420	2090	22500	–
Arsenic	9.8 B	10.1	11.5		124	–	–	49.6	9.4 B	–
Barium	1020	149 B	776	202	488	185 B	178	834	910	–
Beryllium	–	–	1.3 B	–	–	–	–	–	1.2 B	–
Cadmium	–	–	–	–	–	–	–	–	2.7 B	–
Calcium	193000	239000	281000	486000	174000	158000	158000	244000	176000	30.8 B
Chromium	20.7	7.4 B	63.8	11	–	9.5 B	7.3 B	7.3 B	40.5	–
Cobalt	7.6 B	14.3 B	17.8 B	22.9 B	2.5 B	–	2.4 B	3.7 B	10.2 B	–
Copper	5.4 B	3.1 B	16.4 B	4.7 B	–	–	–		68	–
Iron	12900	15500	28800	7170	85400	2370	1700	49200	35800	–
Lead	15.8	7.4	16.7		–	–	–	11.7	238	–
Magnesium	35300	54300	40400	68900	20000	15500	15400	11900	34500	10.2 B
Manganese	273	8460	841	6030	4140	45.7	36	997	2470	–
Mercury	–	–	–	–	–	–	–	–	–	–
Nickel	15.2 B	28.4 B	51.1	44	2.8 B	6 B	5.8 B	3.8 B	29.4	–
Potassium	6720	16600	17100	1850	2780 B	2210 B	2080 B	30000	13300	–
Selenium	7.8	–	–	–	–	8.4	–	–	–	–
Sodium	10900	365000	11300	5220	4360 B	4460 B	4130 B	51900	47000	1720 B
Thallium	–	–	–	–	–	–	–	–	–	–
Vanadium	46.4 B	4.3 B	69.9	14 B	–	2.1 B	–	5.3 B	52	–
Zinc	128	99.6	105	39	21.2	28.3	21.8	50.7	560	2.2 B
Cyanide	–	20.5								10 B
	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L

– Constituent analyzed for but not detected; constituent value below Contract Required Quantitation Limit (CRQL)
J Indicates an estimated value
D Analysis performed at a secondary dilution factor
P Indicates a pesticide/aroclor target analyte when there is greater than 25% difference for the detected concentrations between the two columns. The lower of the two results is reported.
B The reported value is less than the CRDL but greater than the instrument detection limit (IDL).

ATTACHMENT 1

AREA MEASUREMENTS FOR SAUGET AREA 2

Attachment 1

METHOD FOR ESTIMATING AREA OF AREA II SITES

The area of each Area II site was calculated from the aerial photograph that best outlined the site. The photographic scale was determined by measuring equal distances on the USGS 7.5 minute Cahokia Quadrangle and on the aerial photograph. The calculation for determining scale is shown below. The scale value was rounded down to the nearest ten.

A Tamaya Planix 5 polar planimeter was used to trace the perimeter of each individual site on the aerial photographs. Three consecutive runs were made over each site and the lowest value was used. The lowest value was multiplied by the square of the aerial photograph scale value. The result is the area of the site in square inches

Each site's area in square inches was divided by the square of 63,360 (the number of square inches in a square mile). This result was multiplied by 640 (the number of acres in a square mile) and by 27878400 (the number of square feet in a square mile). The calculations are shown below. Calculated by Ted Prescott, Environmental Protection Specialist III, IEPA. Date 3/9/00

CALCULATIONS:
Photo scale: (topo distance)(topo scale)/photo distance
(example: 5in X 24000/10in = 12000
The photo scale is 1 : 12000)

Site "O'
The perimeter of site "O" was established as the top of the berm around the lagoons.

Aerial Photograph dated 3/4/75
photo scale 1:1200
$(\text{photo scale})^2 = 1440000$

Planimeter Runs		Photo Scale		Conversions
1.	97.944695 in^2	scale	1200	63,360 in/mi
2.	97.991195 in^2	squared	1440000	4.0144×10^9 in^2/mi^2
3.	98.037696 in^2	97.944695 x 1440000		141040360.8 ÷ 4.0144×10^9
lowest.	97.944695 in^2	total	141040360.8	Total .035133609 mi^2
				Acres 640/mi^2
				.035133609 x 640 = **22.48 acres**
				.035133609 x 27878400 =
				979468.80 ft^2

Site "S"

The perimeter of site "S" was established as the area southwest of and adjacent to Site "O". The perimeter was established using historic aerial photographs.

Aerial Photograph dated 3/4/75
photo scale 1:1200
(photo scale)^2 = 1440000

Planimeter Runs		Photo Scale		Conversions
1.	46.872093 in^2	scale	1200	63,360 in/mi
2.	47.166594 in^2	squared	1440000	4.0144x10^9 in^2/mi^2
3.	46.934093 in^2	46.872093	x 1440000	67495813.9 ÷ 4.0144x10^9
lowest.	46.872093 in^2	total	67495813.9	Total .016813425 mi^2
				Acres 640/mi^2
				.016813425 x 640 = **10.76 acres**
				.016813425 x 27878400 =
				468731.39 ft^2

Site "R"

The perimeter of site "R" was established as the area northwest of and adjacent to Site "Q". The perimeter was established using historic aerial photographs.

Aerial Photograph dated 3/4/75
photo scale 1:1200
(photo scale)^2 = 1440000

Planimeter Runs		Photo Scale		Conversions
1.	107.818711 in^2	scale	1200	63,360 in/mi
2.	107.864710 in^2	squared	1440000	4.0144x10^9 in^2/mi^2
3.	107.833714 in^2	107.818711	x 1440000	155258943.8 ÷ 4.0144x10^9
lowest.	107.818711 in^2	total	155258943.8	Total .038675504 mi^2
				Acres 640/mi^2
				.038675504 x 640 = **24.75 acres**
				.038675504 x 27878400 =
				1078211.17 ft^2

Site "Q"

The perimeter of site "Q" was established as the area adjacent to the Mississippi River. The site extends south to Red House Road. The perimeter was established using historic aerial photographs.

Aerial Photograph dated 3/4/75
photo scale 1:1200
(photo scale)^2 = 1440000

Planimeter Runs		Photo Scale		Conversions
1.	54.079608 in^2	scale	5120	63,360 in/mi
2.	54.017608 in^2	squared	26214400	4.0144x10^9 in^2/mi^2
3.	53.862607 in^2	53.862607 x	26214400	1411965439 ÷ 4.0144x10^9
lowest.	53.862607 in^2	total	1411965439	Total .351725149 mi^2
				Acres 640/mi^2
				.351725149 x 640 = **225.1 acres**
				.351725149 x 27878400 =
				9805534.4 ft^2

Site "P"

The perimeter of site "P" was established as the triangular area north of Monsanto Avenue and between site "Q" and the W.G. Krummrich plant. The site extends northward between two railroad lines. The perimeter was established using historic aerial photographs.

Aerial Photograph dated 2/27/80
photo scale 1:2400
(photo scale)^2 = 5760000

Planimeter Runs		Photo Scale		Conversions
1.	31.155062 in^2	scale	2400	63,360 in/mi
2.	31.124062 in^2	squared	5760000	4.0144x10^9 in^2/mi^2
3.	31.232562 in^2	31.124062 x	5760000	179274597.1 ÷ 4.0144x10^9
lowest.	31.124062 in^2	total	179274597.1	Total .044657881 mi^2
				Acres 640/mi^2
				.044657881 x 640 = **28.6 acres**
				.044657881 x 27878400 =
				1244990.3 **ft^2**

ATTACHMENT 2

SAMPLE DESCRIPTIONS

SAUGET AREA 2
Attachment 2 SAMPLE DESCRIPTIONS

SAMPLE	DEPTH	APPEARANCE	TVA READINGS (units) PID	FID	LOCATION
X101	21' - 24'	Dk. greenish-grey, very fine sandy silt. Moist-wet.	>100	>150	North portion of buffer zone between Site Site R & Mississippi River.
G101	20' - 24'	Dk. brown in color, cleared to a slightly brown tint prior to sampling	NA	NA	Same bore hole as X101.
G102	21' - 23'	Med. grey in color, cleared to slightly grey tint prior to sampling.	NA	NA	Central portion of buffer zone between Site R & Mississippi River.
X102	16' - 20'	Very Dk. grey, fine sandy silt. Wet-saturated.	0.35	1.15	South portion of buffer zone between Site R & Mississippi River.
G103	20' - 24'	Dk. grey in color, cleared to slightly cloudy w/ grey tint prior to sampling.	NA	NA	Same bore hole as X102.
X103	10' - 12'	Black organic material w/ Lt. tan streaking. Petroleum odor. Wet-saturated, oily.	1	25	NW corner of dog leg of Site Q, east of Site R.
G104	24' - 28'	Med. brown in color, very sandy, clearing to Lt. brown tint prior to sampling.	NA	NA	Bore hole approx. one foot south of X103.
X104	16' - 18'	Black oily substance w/ green tint saturated sandy, silty material. Probe rods became filled w/ the oily liquid.	45	>150	SW corner of dog leg of Site Q, east of Site R.
G105	24' - 27' (attempted)	No water could be pumped from hole. Oily substance in hole was too viscous to be pumped and sampled. G105 was deleted.	45 Ambient air in bore hole	>150	Same bore hole as X104.
G106	16' - 18'	Lt. brown in color, turbidity & color progressed to clear prior to sampling.	-0.10	0.54	Central west portion of Site Q, at bank of Mississippi River, west of Eagle Marine's operations.
X105	11' - 13'	Dk. brown-black fill material w/ some greenish grey - Dk. brown - black sandy silt.	0.16	1600	SW portion of Site Q, at south end of Eagle Marine's operation near bank of Mississippi River.
G107	20' - 24'	Lt. grey - Lt. brown in color, progressed to clear prior to sampling.	-0.14	2000	Same bore hole as X105.
X106	6' - 8'	Med. brown, Med. sand. Saturated.	60 Ambient air in bore hole	15	Far south end of Site Q, west side of west pond.
G108	16' - 20'	Lt. - Med. brown in color, cleared to slightly cloudy, with a tan tint prior to sampling.	NA	NA	Same bore hole as X106.
G109	17' - 19'	Med. - Dk. brown in color, cleared to a Lt. tan tint prior to sampling.	-0.14	0.96	Approximately 200 yards west of Site P along a pump station access road.

SAUGET AREA 2
Attachment 2 SAMPLE DESCRIPTIONS (cont.)

SAMPLE	DEPTH	APPEARANCE	TVA READINGS (units) PID	FID	LOCATION
X107	9' - 11'	Dk. brown sandy silt, refuse & rubble.	1.8	48	Central southern end of Site P.
			2 Ambient air in bore hole	7900	
G110	24' - 28'	Lt. - Med. brown in color, cleared to a Lt. brown, milky tint prior to sampling.	NA Through center of probe rods at depth.	7500	Same bore hole as X107.
X108	10' - 12'	Lt.- Med. tan, Med. sand.	0.34	2.05	Far northern portion of former Sauget WWTP sludge lagoon #2, Site O.
G111	16.5' - 18.5'	Med. brown in color, clearing to to slightly cloudy Lt. tan, prior to sampling.	NA	NA	Same bore hole as X108.
G112	18' - 20'	Med. brown in color, clearing to slightly cloudy slight grey tint prior to sampling.	NA	NA	Southern portion of former Sauget WWTP sludge lagoon #3, Site O.
G113	8' - 12'	Clear w/ grey tint, progressed to slightly more clear grey tint remained prior to sampling.	0.84 soil core readings	5.5	North end of gravel covered portion of Site S.
X109 & X110 (Dup of X109)	8' - 12'	Med. tan-Med. brown, Fine-Med. sand. Saturated.	2.8	1.8	Near south end of gravel covered portion of Site S.
G114 & G115 (Dup of G114)	16' - 20'	Clear w/ tan tint, progressed to slightly cloudy, w/tan tint prior to sampling.	NA	NA	Same bore hole as X109/X110.
X111	14' - 17'	Black fill material from 14' - 15', newspaper from 15' - 16', wet black gravelly fill from 16' - 17'.	0.44	900	Central portion of Site Q,east of Eagle Marine's landscape material storage area.
G116	17' - 19'	Dk. brown - some Dk. grey color, cleared to slightly Lt. grey tint prior to sampling.	NA	NA	Same bore hole as X111.
X112	10.5' - 13'	Med. - Dk. grey tight sandy silt from 10.5' - 12', Med. tan - reddish, yellowish tan silty clay from 12' - 13'.	0.4	1200	South-central portion of Site Q, at south end of Eagle Marine's operation.
G117	16' - 20'	Dk. grey in color, clearing to Lt. grey tint prior to sampling.	NA	NA	Same bore hole as X112.
X113	16' - 18'	Paper and insulation type material mixed w/ black cinders. Yellow, sulfur appearing substance at 16'.	NA	5900	North portion of Site P.

ATTACHMENT 3

IEPA SAMPLE PHOTOGRAPHS

SITE NAME: SAUGET AREA 2	
CERCLIS ID: ILD 000605790	**COUNTY:** ST. CLAIR

DATE: May 24, 1999
TIME: 1100 & 1200
PHOTO BY: Ann Cross
SAMPLE: X101 & G101
DIRECTION: South
COMMENTS: Photo taken of soil and ground water sample location in north portion of buffer zone between Site R & the Mississippi River.

DATE: May 24, 1999
TIME: 1400
PHOTO BY: Ann Cross
SAMPLE: G102
DIRECTION: East
COMMENTS: Photo taken of ground water sample location in central portion of buffer zone between Site R & the Mississippi River.

SITE NAME: SAUGET AREA 2	
CERCLIS ID: ILD 000605790	COUNTY: ST. CLAIR

DATE: May 24, 1999
TIME: 1445 & 1515
PHOTO BY: Ann Cross
SAMPLE: X102 & G103
DIRECTION: West
COMMENTS: Photo taken of soil and ground water sample location in southern portion of buffer zone between Site R & the Mississippi River.

DATE: May 24, 1999
TIME: 1715 & 1730
PHOTO BY: Ann Cross
SAMPLE: X108 & G111
DIRECTION: N-NW
COMMENTS: Photo taken of soil & ground water sample location in the far northern portion of former sludge lagoon #2, Site O.

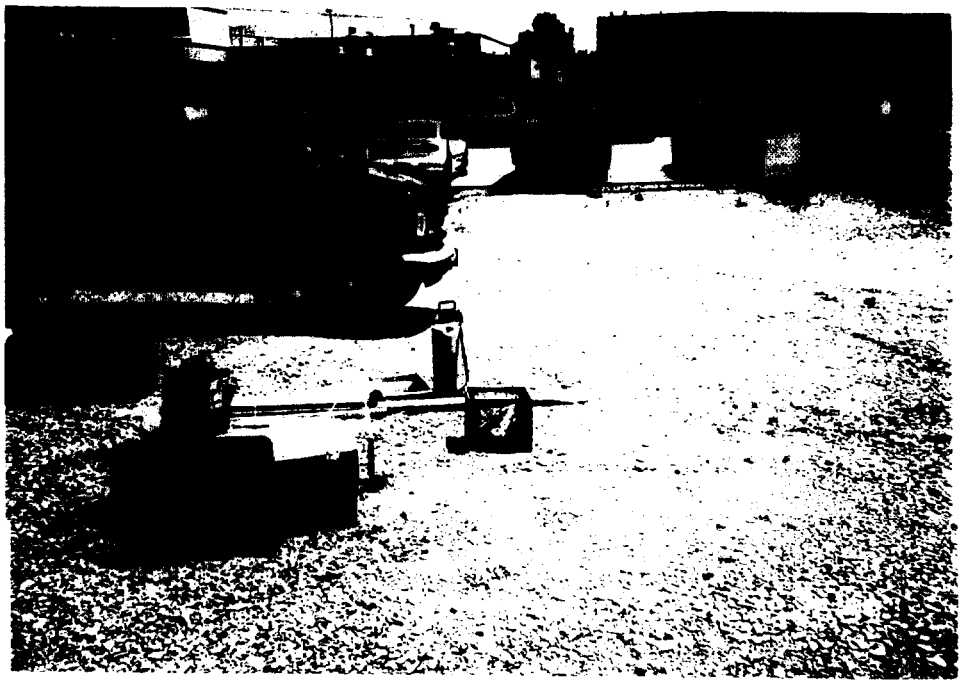
SITE NAME: SAUGET AREA 2	
CERCLIS ID: ILD 000605790	COUNTY: ST. CLAIR

DATE: May 25, 1999
TIME: 1045
PHOTO BY: Ann Cross
SAMPLE: G112
DIRECTION: East
COMMENTS: Photo taken of ground water sample location in the southern portion of former sludge lagoon #3, Site O.

DATE: May 25, 1999
TIME: 1145
PHOTO BY: Ann Cross
SAMPLE: G113
DIRECTION: E-NE
COMMENTS: Photo taken of ground water sample location near north end of gravel covered portion of Site S.

SITE NAME: SAUGET AREA 2	
CERCLIS ID: ILD 000605790	COUNTY: ST. CLAIR

DATE: May 25, 1999
TIME: 1330
PHOTO BY: Ann Cross
SAMPLE: X109 & X110
DIRECTION: East
COMMENTS: Photo taken of soil sample location near south end of gravel covered portion of Site S.



DATE: May 25, 1999
TIME: 1330
PHOTO BY: Ann Cross
SAMPLE: G114 & G115
DIRECTION: West
COMMENTS: Photo taken of ground water sample location near south end of gravel covered portion of Site S.

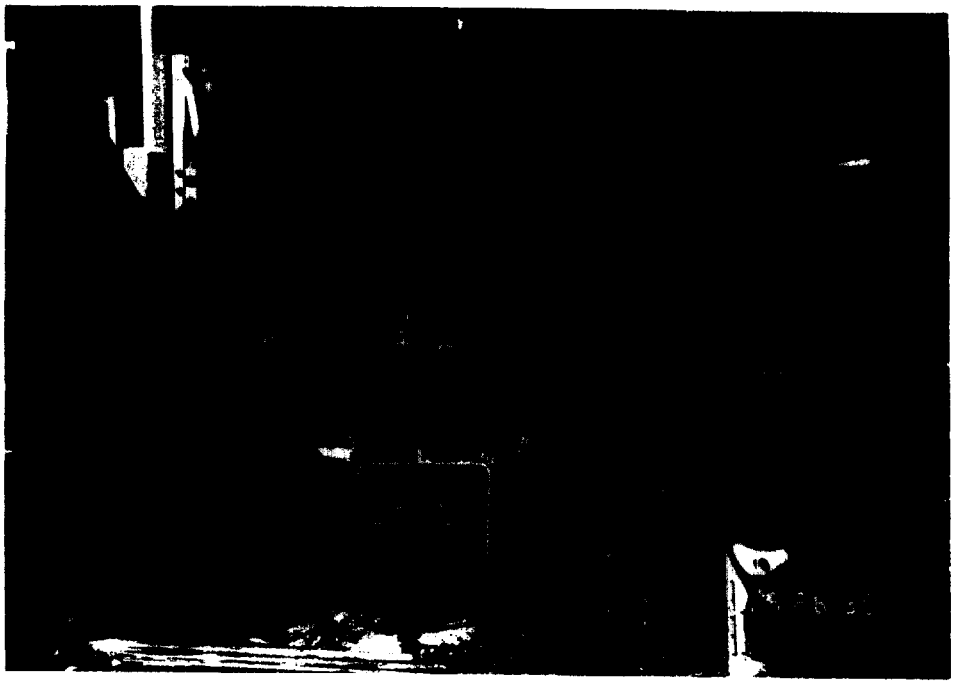
SITE NAME: SAUGET AREA 2	
CERCLIS ID: ILD 000605790	COUNTY: ST. CLAIR

DATE: May 25, 1999
TIME: 1515 & 1530
PHOTO BY: Ann Cross
SAMPLE: X106 & G108
DIRECTION: East
COMMENTS: Photo taken of soil & ground water sample location at far south end of Site Q, west side of west pond.

DATE: May 25, 1999
TIME: 1730
PHOTO BY: Ann Cross
SAMPLE: X113
DIRECTION: South
COMMENTS: Photo taken of soil sample location in the north portion of Site P.

SITE NAME: SAUGET AREA 2	
CERCLIS ID: ILD 000605790	COUNTY: ST. CLAIR

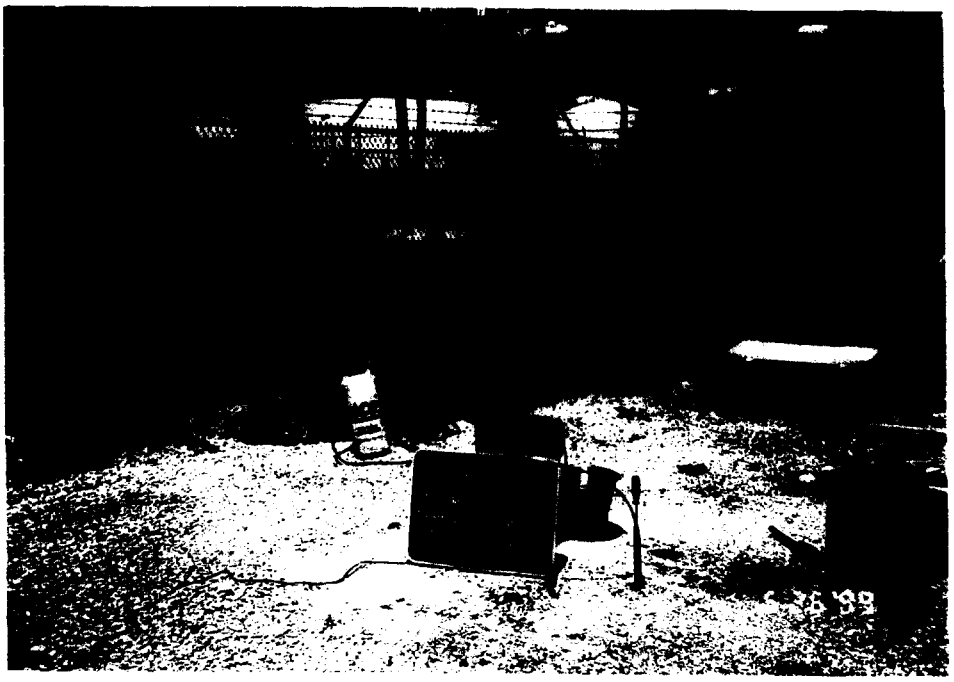
DATE: May 26, 1999
TIME: 0950
PHOTO BY: Ann Cross
SAMPLE: X107 & G110
DIRECTION: NE
COMMENTS: Photo taken of soil & ground water sample location near southern end of Site P



DATE: May 26, 1999
TIME: 1200
PHOTO BY: Ann Cross
SAMPLE: X103
DIRECTION: E-SE
COMMENTS: Photo taken of soil sample location in the NW corner of dog leg of Site Q, east of Site R.

SITE NAME: SAUGET AREA 2	
CERCLIS ID: ILD 000605790	**COUNTY:** ST. CLAIR

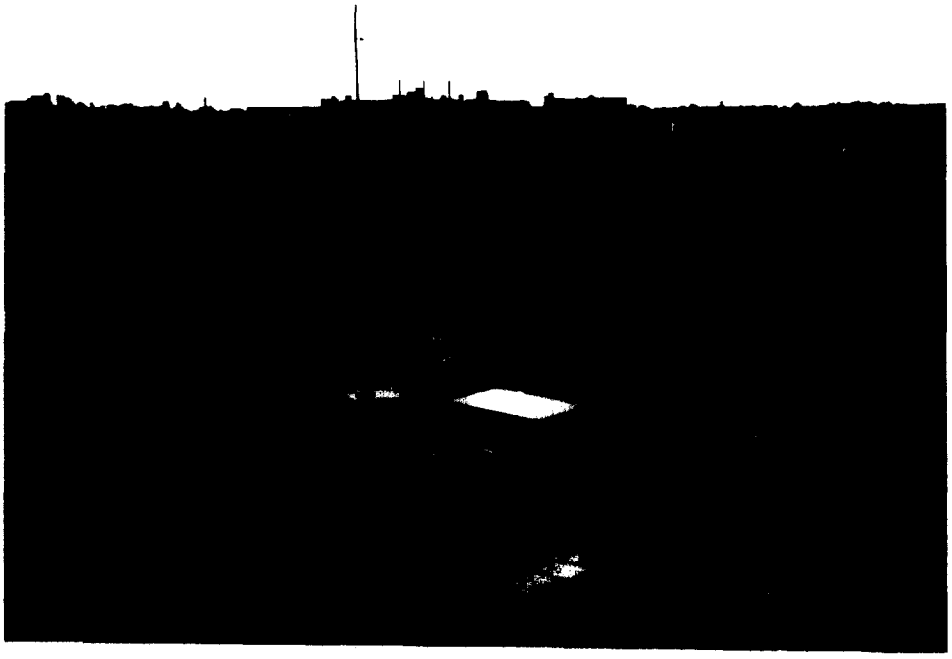
DATE: May 26, 1999
TIME: 1300
PHOTO BY: Ann Cross
SAMPLE: G104
DIRECTION: North
COMMENTS: Photo taken of ground water sample location in the NW corner of the dog leg of Site Q, east of Site R.



DATE: May 26, 1999
TIME: 1430
PHOTO BY: Ann Cross
SAMPLE: X104
DIRECTION: South
COMMENTS: Photo taken of soil sample location in the SW corner of the dog leg of Site Q, east of Site R.

SITE NAME: SAUGET AREA 2	
CERCLIS ID: ILD 000605790	COUNTY: ST. CLAIR

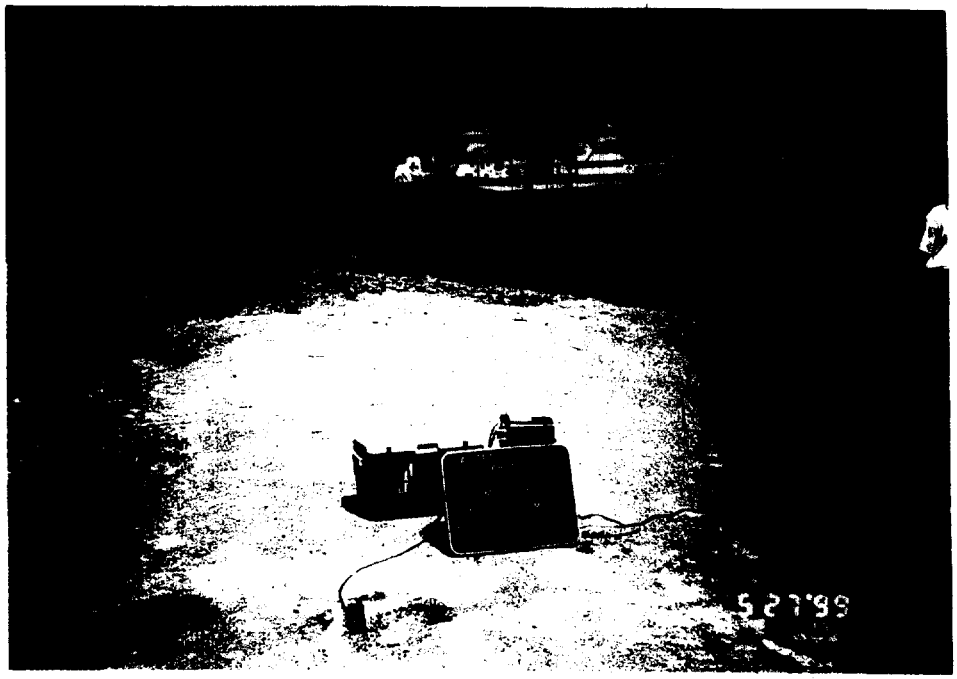
DATE: May 26, 1999
TIME: 1715
PHOTO BY: Ann Cross
SAMPLE: X111 & G116
DIRECTION: West
COMMENTS: Photo taken of soil & groundwater sample location in central portion of Site Q, east of Eagle Marine's landscape material storage area.



DATE: May 27, 1999
TIME: 0930
PHOTO BY: Ann Cross
SAMPLE: G106
DIRECTION: North
COMMENTS: Photo taken of ground water sample location in central west portion of Site Q, at bank of Mississippi River, west of Eagle Marine's operations.

SITE NAME: SAUGET AREA 2	
CERCLIS ID: ILD 000605790	**COUNTY:** ST. CLAIR

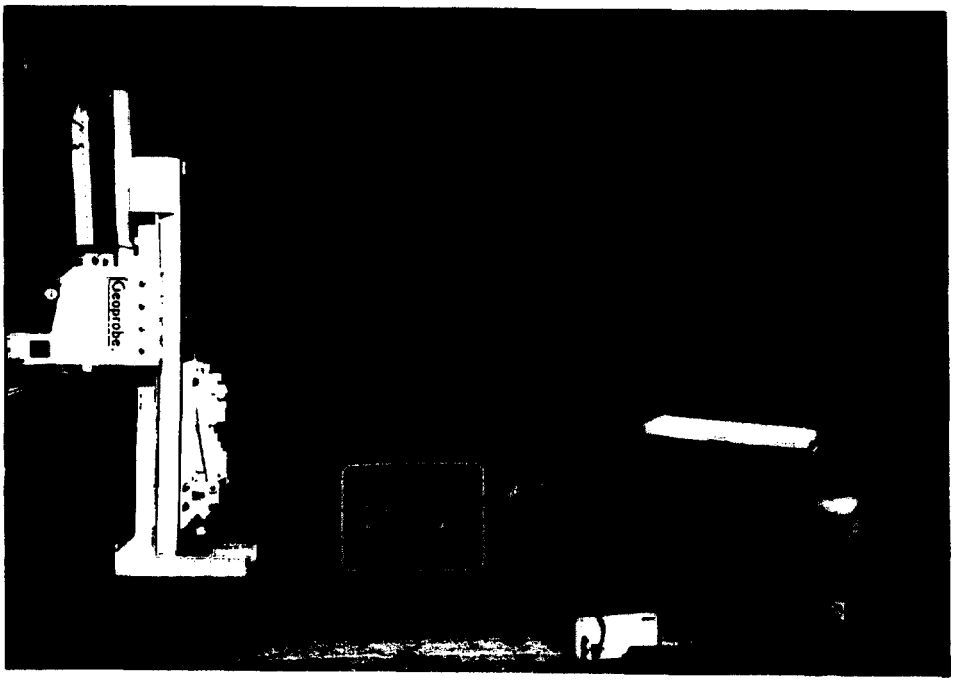
DATE: May 27, 1999
TIME: 1045
PHOTO BY: Ann Cross
SAMPLE: X105 & G107
DIRECTION: West
COMMENTS: Photo taken of soil & groundwater sample location in SW portion of Site Q, at south end of Eagle Marine's operation near bank of Mississippi River.



DATE: May 27, 1999
TIME: 1245 & 1300
PHOTO BY: Ann Cross
SAMPLE: X112 & G117
DIRECTION: SW
COMMENTS: Photo taken of soil & groundwater sample location in south-central portion of Site Q, at south end of Eagle Marine's operation.

SITE NAME: SAUGET AREA 2	
CERCLIS ID: ILD 000605790	**COUNTY:** ST. CLAIR

DATE: May 27, 1999
TIME: 1515
PHOTO BY: Ann Cross
SAMPLE: G109
DIRECTION: East
COMMENTS: Photo taken of ground water sample location approximately 200 yds. west of Site P, along a pump station access road.



DATE: May 26, 1999
TIME: 1345
PHOTO BY: Ann Cross
SAMPLE: Oily liquid in X104 bore hole.
DIRECTION: South
COMMENTS: Oily substance from approximately 12 to 16 feet below ground surface. Later analysis indicated elevated levels of VOC's, semi-vol. & PCB's.